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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/971,763	10/09/2001	Moo-youl Kim	P56598	4212

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EXAMINER
BROOKE, MICHAEL S

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 04/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/971,763	Applicant(s) KIM ET AL.	
	Examiner Michael S. Brooke	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *11/22/02, 03/24/03* is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action. * See Office Action

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. The examiner discussed this matter with Mr. Lustina on 04/02/03. Mr. Lustina indicated that the "prior art" label would be added, in view of Fig. 9 of Keefe et al. (5,278,584).

2. The Examiner also wishes to clarify the current status of the drawing corrections. The drawing correction submitted on 03/2403 is accepted. The Drawing corrections submitted on 11/22/02 are accepted with regard to Figs. 2 and 3 only.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 4-16 and 18-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silverbrook (5,841,452) in view of Koto (4,368,478).

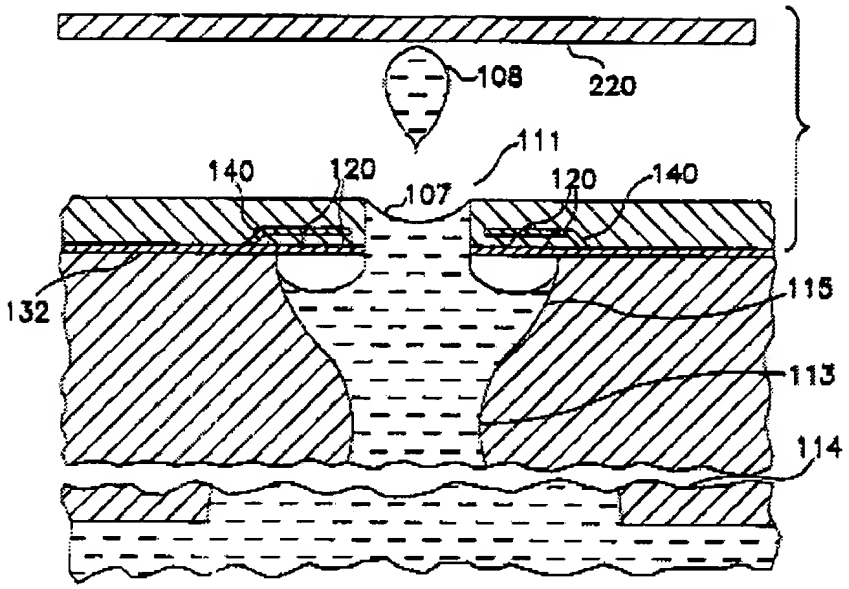

FIG. 17

Silverbrook teaches (Fig. 17, above) an ink jet print head comprising a base plate (130), which is perforated by an hour-glass shaped structure having a hemispherical shaped top portion that is filled with ink, a nozzle plate that is mounted on the base plate and is perforated by a plurality of orifices in communication with their respective chambers, a plurality of dough-nut shaped heaters (120) disposed on the underside of the nozzle plate and surrounding each nozzle and a plurality of circular ink inlet passages (113), which supply ink from a reservoir to the hemispherical hour-glass shaped chamber. As can be seen Fig. 18 (which is a reverse structure of Fig. 17), each hemispherical chamber is connected to a funnel shaped chamber (489). Since Fig. 18 is a reverse of Fig. 17, these funnel shaped chambers would be found beneath the hemispherical chambers of Fig. 17.

Silverbrook teaches the claimed invention with the exception of the ink inlet passages each having a plurality of grooves formed at an inner wall, the plurality of

grooves extending through the base plate, the plurality of grooves being formed over an entire portion of said inner wall and the plurality of grooves extending in a direction parallel to a direction through said substrate and the grooves being formed around the entire circumference of the ink passages.

Koto teaches (Fig. 9A) an ink jet printer having an air trapping chamber (55) that is formed along the ink flow path. The chamber has a plurality of serrations formed in the inner surface (55a). The serrations improve the capillary action of the ink supply passage by reducing the flow resistance (col. 9:27-53). While Koto does not specifically teach providing the grooves a plurality of ink passages in the substrate, one of ordinary skill in the ink jet art would recognize that Koto provides the general teaching of providing grooves in the ink flow path, in order to improve ink flow. Since both Koto and Silverbrook deal with supplying ink through a flow passage, the teachings of Koto would be applicable to Silverbrook.

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided Silverbrook with an ink inlet passage having a plurality of grooves formed in its walls, such that the grooves cover an entire portion of the wall, in a direction parallel to the ink flow direction (which is through the substrate), for the purpose of improving the flow of ink by reducing the flow resistance, as taught by Koto.

4. Claims 1-3, 5, 7, 12-13, 15, 17, 18 and 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (6,102,530) in view of Browning et al. (6,132,033) and Koto (4,368,478)

Kim et al. teaches an ink jet print head comprising a substrate (38) that is provided with a plurality of chambers (14). A nozzle plate, having orifices (18) is provided an the substrate. A plurality of heaters (20, 22) are provided on the nozzle plate. An ink inlet passage (16) is provided through the substrate, to supply ink to the bottoms of the ink chambers.

With regard to claims 2 and 5, Fig. 1 illustrates that the inlet passages are formed through the base plate.

With regard to claims 3, 17 and 20, Fig. 2B illustrates that each of the heaters is formed on the outer side of the nozzle plate and heats the ink by conduction.

With regard to claim 7, Fig. 2B illustrates that that the ink inlet passage extends though the substrate from the bottoms of the ink chambers.

With regard to claim 12, Fig. 12 illustrates that the ink chambers and inlet passage have a generally "hour glass" shaped configuration.

With regard to claim 13, Fig. 12 illustrates that the bottom of the hour glass is a funnel shape, and is connected to the ink chamber by the ink inlet.

With regard to claims 15 and 18, Fig. 1 illustrates that the heaters have a "donut" shape and encircle the orifices.

Kim et al. teaches the claimed invention with the exception of a plurality of circular ink inlet passages, ink inlet passages each having a plurality of grooves formed at an inner wall, the plurality of grooves extending through the base plate, the plurality of grooves being formed over an entire portion of said inner wall and the plurality of

grooves extending in a direction parallel to a direction through said substrate and the grooves being formed around the entire circumference of the ink passages.

Browning et al. teaches that a single, large ink inlet passage and a plurality of smaller, circular ink inlet passages are known equivalents in the ink jet art for supplying ink to a plurality of ink chambers (col. 3:17-21). Because these two different ink inlet structures were art recognized equivalents at the time the invention was made, one of ordinary skill in the ink jet art would have found it obvious to have substituted a plurality of circular ink passages for the single large ink passage of Kim et al., for the purpose of providing ink to the ink chambers.

Koto teaches (Fig. 9A) an ink jet printer having an air trapping chamber (55) that is formed along the ink flow path. The chamber has a plurality of serrations formed in the inner surface (55a). The serrations improve the capillary action of the ink supply passage by reducing the flow resistance (col. 9:27-53). While Koto does not specifically teach providing the grooves a plurality of ink passages in the substrate, one of ordinary skill in the ink jet art would recognize that Koto provides the general teaching of providing grooves in the ink flow path, in order to improve ink flow. Since both Koto and Kim et al. deal with supplying ink through a flow passage, the teachings of Koto would be applicable to Kim et al..

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made to have provided Kim et al. with an ink inlet passage having a plurality of grooves formed in its walls, such that the grooves cover an entire portion of the wall, in a direction parallel to the ink flow direction (which is through the substrate),

for the purpose of improving the flow of ink by reducing the flow resistance, as taught by Koto.

5. Claims 4, 6, 8, 9, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (6,102,530) in view of Browning et al. (6,132,033) and Koto (4,368,478), as applied to claims1-3, 5, 7, 12-13, 15, 17, 18 and 20-28 above, and further in view of Silverbrook 5,841,452)

Kim et al., as modified, teaches the claimed invention with the exception of the ink chambers having a hemispherical shape.

Silverbrook teaches that an in jet print head having a hemispherical ink chamber (Fig. 18) and a print head having a polygonal ink chamber (Fig. 19) are known equivalents in the ink jet art for the purpose of ejecting ink. Since these two different ink chambers structures where art recognized equivalents at the time the invention was made, on of ordinary skill in the ink jet art would have found it obvious to have substituted a hemispherical ink chamber, for the polygonal ink chamber of Kim et al.

Response to Arguments

6. Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 703-305-0262. The examiner can normally be reached on M-F 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

Michael S. Brooke
Examiner
Art Unit 2853

MSB
April 4, 2003